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AMERICAN STATISTICAL ASSOCIATION.

NEW SERIES, No. 102.

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INTERNATIONAL STATISTICS OF THE CONSUMPTION OF ALCOHOL.*

BY DR. E. W. MILLIET.

A. RELATIVE TO THE COLLECTION OF THE QUANTITATIVE DATA.

I. Notwithstanding their importance, the statistics of the human consumption of alcohol have so far generally been neglected in an unwarrantable manner. To be sure statistics of such consumption have received more careful attention than those of the consumption of other things. Nevertheless the data obtained even from this limited field of observation do not correspond to the importance of the subject nor to the demands of science. Finally the statistics of alcohol are endangered in their objectivity by the strenuous opposition of philanthropic and economic interests.

The Institute which we intend to create has therefore occasion enough to direct its attention to this branch of consumption statistics. To the inherent reasons must be added the outward circumstance that several other international associations have already besought the preparation of trustworthy international statistics of alcohol.

II. The existing data in regard to the consumption of alcohol in the different civilized countries are altogether fragmentary and of such incongruous content that a comparison for different periods of time within the same field of observation or in different fields of observation for the same period of time is not possible, or can be made only under reservations which render the value of the comparison illusory.

* These theses on international statistics of the consumption of alcohol were submitted by Dr. Milliet to the International Committee for the Scientific Study of the Alcohol question at its meeting at Paris in January of the present year. They are a part of his official report on the meeting of the International Committee to the *conseil fédéral* of Switzerland, and have not hitherto been given general publicity. Dr. Milliet, who is professor of law at the University of Bern, is perhaps the foremost authority in the world on statistics of alcohol. This lends a special interest and weight to his theses, aside from the fact that they will probably be made the basis of some of the work of the above mentioned International Committee.

III. Every attempt to improve the material at hand necessarily predicates an incisive knowledge of it. As such knowledge as a rule exists only in the individual states and even there for the greater part is insufficient, the preparation for international statistics must be preceded by a thoroughgoing knowledge of the value of the national statistics.

IV. To make it possible to obtain such knowledge, it is proposed to have one reporter selected for each participating country; these reporters should together form a commission.

V. Each reporter should submit within a period of time to be determined later, and according to a questionnaire prepared by the commission, a report in regard to the extent and the statistical value of the existing data relative to the consumption of alcohol for this country and submit proposals for a better collection or preparation of such data. After the reports have been sent in, the commission shall decide in regard to further proceedings.

VI. The following questionnaire is a preliminary suggestion in regard to the program of work of the reporters.

1. Are data at hand concerning the entire country in regard to the production of

- (a) Wine,
- (b) Beer,
- (c) Distilled spirits and brandy,
- (d) Other alcoholic beverages,

and, if so, for what periods of time?

2. Are the data enumerated under No. 1 at hand only for certain parts of the country; if so, for what kinds of products, for what parts of the country, and for what periods of time?

3. Do the data in regard to the production of wine (1 and 2) include all wines, or only certain kinds; if the latter, which? (Wine from fresh grapes grown in the country, from fresh fruit or fresh berries grown in the country, from fresh imported grapes, from imported fresh fruit or fresh berries, from dried berries grown in the country or imported).

4. Do the data in regard to the quantities of wine of the different categories relate only to the products of the first pressing or also to those of a possible second or third pressing?

5. Do the figures in regard to wines of the different cate-

gories comprehend only the fermented products or also those consumed in a sweet or partly fermented condition?

6. Do the figures in regard to the production of beer also include the quantity brewed in private homes? If not, what is the general importance of the preparation of beer in homes?

7. Which categories of distilled spirits and brandy are included in the statistics, which not? (Distillation from raw material containing alcohol, from material containing sugar, from material containing starch).

8. What other alcoholic beverages besides wine, beer, and brandy are to be considered?

9. Are any data at hand in regard to the degree of alcohol contained in the alcoholic beverages produced, and which?

10. In what manner are the compilations in regard to the production of the different spirituous products obtained and what degree of trustworthiness may be claimed for them?

11. How are the compilations in regard to the importation and exportation of the different alcoholic products obtained and how far do the results correspond to actual conditions? For what products, regions, and periods of time are such compilations at hand?

12. What standard is used in transposing the imported brutto or net weights into measures of volumes?

13. Are there any data in regard to the percentage of alcohol contained in the different articles of importation and exportation, and which?

14. What changes do the produced or imported products undergo and what losses in quantity occur by working them over, by manipulation, by transport, etc., until they reach consumption or export?

15. What data are at hand in regard to the consumption of the different kinds of spirituous beverages according to quantity and degree of alcohol,

- (a) for the whole country,
- (b) for different parts of same,
- (c) for single well-defined classes of society,
- (d) for families or individuals?

How far can these data claim to be exact?

16. What part of the consumption is due to drinking and what part to industrial uses? (enumeration of the latter).

17. What money value is represented by the consumption

(a) for purposes of drinking,

(b) for industrial purposes?

That is, what do the consumers pay to satisfy their need for spirituous products (a and b)? How are the figures in question obtained and what degree of exactness may be attributed to them?

18. What is the approximate proportion of the population which is abstinent in regard to alcoholic beverages?

19. Is the population of consumers a very fluctuating one for the whole country or for different parts of it?

20. What are the sources from which the statistics of the consumption of alcohol are obtained? What criticism is to be made in general concerning the methods used in the collection, preparation, and publication of these statistics?

B. CONCERNING THE UTILIZATION OF THE DATA, TAKING INTO CONSIDERATION THE VARYING EFFECT OF THE DIFFERENT BEVERAGES BY MEANS OF WEIGHTED VALUES.

The usual comparison of the consumption of alcohol consists in that the average quantities of each beverage consumed per head of an assumed population are reduced to absolute alcohol and then contrasted. Thus we find in one of the most recent works (Grosjahn & Kaupp) the following figures for the five year period, 1901-1905:

	Liquid Liters.			Liters Absolute Alcohol.			Total.
	Beer.	Wine.	Spirits at 50%.	Beer.	Wine.	Spirits.	
France.....	36.0	139.0	7.00	1.40	16.70	3.50	21.60
Italy.....	98.0	114.0	1.30	0.03	13.70	0.65	14.40
Belgium.....	218.0	4.6	7.00	8.70	0.55	3.50	12.80
Switzerland.....	64.0	74.0	4.00	2.60	7.40	2.00	12.00
Denmark.....	95.0	1.5	14.10	2.69	0.18	7.05	9.90
Great Britain and Ireland.....	133.0	1.6	5.20	6.65	0.24	2.60	9.50
German Empire.....	119.0	6.6	8.10	4.76	0.66	4.05	9.50
Austro-Hungary.....	42.0	17.7	10.30	1.68	2.12	5.15	8.95
Bulgaria.....	1.7	51.4	1.35	0.68	6.17	0.68	7.50
U. S. A.....	67.0	1.8	5.30	3.35	0.27	2.65	6.30
Sweden.....	59.0	0.6	7.60	1.67	0.13	3.80	5.60
Rumania.....	1.0	21.0	4.00	0.04	2.52	2.00	4.60
Russia.....	4.5	4.0	5.20	0.18	0.60	2.60	3.40
Norway.....	15.7	1.6	3.20	0.60	0.20	1.60	2.40
Finland.....	10.2	0.5	2.80	0.34	0.60	1.40	2.30

To judge from this, *according to the consumption of absolute alcohol*, France would have a showing $9\frac{1}{2}$ times less favorable than Finland. Does this proportion, considered from the point of view of the actual effect of the consumption of the different alcoholic beverages, correspond to actual conditions? Is it at all admissible that the percentage of alcohol should be the only consideration in judging these effects? Is it at all admissible that the consumption of a quart of natural wine with 8 per cent. of alcohol should be placed in the same line with the consumption of a fifth of a quart of spirits containing fusel oil and having 40 per cent. of alcohol? These questions we necessarily must answer in the negative.

In the above ranking of states, France and the other countries immediately following are found to stand at the head chiefly because they show a high consumption of wine or beer. Inasmuch as we know from daily experience as well as from experiments and from the statistics bearing on the consequence of the consumption that the different alcoholic beverages show a varying effect, a correct ranking of the countries can only be obtained when we give due consideration to the various effects by the use of suitable coefficients.

However, *the measure* to be applied to the varying influence of the single beverages is not yet sufficiently known so that we can determine the proper statistical weights at the present time. It is therefore a necessary and important task for the institute about to be created to provide the necessary basis for the differential treatment by inquiry into the effect not only of alcohol as such, but also of the various concrete forms in which it is consumed.

Generally speaking, wine is the least harmful and spirits the most harmful beverage. Cider and beer occupy intermediate positions. If we start—to be sure, somewhat arbitrarily—from the assumption that the injury resulting from spirits is 4 times, that from cider, $2\frac{1}{2}$ times, and that from beer is $1\frac{1}{2}$ times as great as the injury consequent upon the consumption of wine, then we obtain, on the basis of the figures at our disposal, the following weighted average values (weighted means) concerning the three countries France, Switzerland, and Norway:

AVERAGE YEARLY CONSUMPTION IN HL OF ABSOLUTE ALCOHOL.

	With Regard to Differential Coefficients of Effect.			Without Regard to Differential Coefficients of Effect.		
	France.	Switzerland.	Norway.	France.	Switzerland.	Norway.
Wine.....	6,769,070	307,545	2,447	6,769,070	307,545	2,447
Beer.....	711,900	98,980	17,070	1,067,850	148,470	25,605
Cider.....	480,800	53,025		1,202,000	132,563	
Spirits.....	1,346,190	102,515	29,786	5,384,760	410,060	119,144
Total.....	9,307,960	562,065	49,303	14,423,680	998,638	147,196

Assuming an average population for France of 38,845,000
for Switzerland of 3,535,000
and for Norway of 2,333,000

the consumption per head amounted

	according to the simple arithmetical mean to liters	according to the weighted mean to liters
France.....	23.96	37.13
Switzerland....	15.90	28.25
Norway.....	2.12	6.31

According to the prevailing method France would appear to be $1\frac{1}{2}$ times more alcoholized than Switzerland, and about 11 times more than Norway. According to the new method used, its relation to Switzerland would be about $1\frac{1}{3}$ and to Norway only 6. And the relation of Norway to Switzerland would be 1 to $7\frac{1}{2}$ according to the old method, but according to the new method of only 1 to $4\frac{1}{2}$.

Although the new relative figures do not as yet rest upon a basis to which no objection can be raised, they nevertheless approach in our opinion more closely the truth than the old figures.

C. UTILIZATION OF DATA BY MEASURING THE WEIGHTED MEAN FIGURES AGAINST AN IDEAL CONSUMPTION.

Inasmuch as up to the present time it has nowhere been possible to determine the actual individual consumption for large classes of population, one is forced to ascertain the per

capita consumption from the general consumption. The method used in this connection starts practically without exception with the total population. By this process, many important circumstances are neglected and it is certainly out of the question to overcome all the defects adhering to it. On the other hand, our institute-to-be would surely render a service if it made possible corrections an object of its studies. We should regard it as a distinct improvement if, for instance, the questions of sex, of relative age, and of the domicile of the population were taken into consideration. As a possible method of procedure we would suggest a measurement of the per capita consumption, ascertained according to the weighted mean, as against an ideal consumption, that is, one whose existence would no longer admit of alcoholism being spoken of as a national disease. As an ideal consumption, we should, for instance, regard one amounting annually to the quantities of absolute alcohol per head given below:

	For the Population of Cities.	For the Rural Popu- lation.
Children of 15 years and under.....	0	0 Liters
Females over 15 years.....	4	6
Males over 15.....	6	9

The three states which we discussed under B showed approximately the following groups of population for the period 1905—1909.

Ages (as above).	France.		
	Cities.	Country.	Total.
Children.....	2,643,000	7,447,000	10,090,000
Adults, female.....	4,880,000	9,840,000	14,720,000
Adults, male.....	4,287,000	9,748,000	14,035,000
Total.....	11,810,000	27,035,000	38,845,000
	Switzerland.		
Children.....	225,000	932,000	1,157,000
Adults, female.....	305,000	913,000	1,218,000
Adults, male.....	260,000	900,000	1,160,000
Total.....	790,000	2,745,000	3,535,000
	Norway.		
Children.....	215,000	612,000	827,000
Adults, female.....	250,000	555,000	805,000
Adults, male.....	195,000	503,000	698,000
Total.....	660,000	1,670,000	2,230,000

If we apply to these groups of population the per capita percentage assumed, the average annual *ideal consumption* for 1905-1909 would be as follows:

		Compared with the Weighted Average Figures.
France.....	1,920,140 HL	14,423,680 HL
Switzerland.....	163,580	998,638
Norway.....	100,270	147,196

According to these figures we get the following percentages of the ideal weighted average consumption:

France.....	751 per cent.
Switzerland.....	610 per cent.
Norway.....	147 per cent.

We deduce from this that while Norway has attained much nearer to the ideal than the two other countries, even there much remains to be done in the combat against an excessive use of alcohol.